This list of claims will replace all prior versions and listings of claims in this application.

**LISTING OF THE CLAIMS**

1. (Currently amended) A method of detecting, characterising, or monitoring a hydrocarbon zone~~, which method comprises~~ comprising performing genotypic analysis on a sample for the presence of one or more thermophilic or extremophilic microorganisms, wherein the presence or absence of said one or more thermophilic or extremophilic microorganisms indicates (1) the presence or absence of a hydrocarbon zone or (2) the properties of the hydrocarbon zone; wherein comparison of the properties of the hydrocarbon zone in the sample relative to the properties of the hydrocarbon zone in prior or subsequent samples identifies changes in the hydrocarbon zone.

2. (Previously presented) A method as claimed in claim 1 wherein the sample is from a sub-surface formation.

3. (Currently amended) A method as claimed in claim 1 wherein the sample is oil, water or an oil/water mixture from an exploration or production well.

4. (Previously presented) A method as claimed in claim 1 wherein the sample is oil or water that has been exposed to oil.

5. (Previously presented) A method as claimed in claim 1 wherein information regarding the microorganisms present is utilized in an ongoing exploration or production process.

6. (Previously presented) A method as claimed in claim 1 wherein a plurality of different microorganisms are detected thereby generating a microbiological profile for said sample.

7. (Original) A method as claimed in claim 6 wherein the generated microbiological profile is compared against one or more reference profiles.

8. (Previously presented) A method as claimed in claim 1 wherein the sample is analyzed for the presence of Archaeglobus, Erythrobacter, Arcobacter, Geothermobacter, Thermodesulforamonas and Thermotogales.

9. (Previously presented) A method as claimed in claim 1 which does not comprise a culturing step.

10. (Previously presented) A method as claimed in claim 1 wherein the sample is

contacted with one or more different oligonucleotides designed to hybridise to regions of nucleic acid from or derived from the thermophilic or extremophilic microorganisms.

11. (Currently amended) A method as claimed in claim 1 wherein nucleic acid from or derived from the thermophilic or extremophilic microorganisms within the sample is amplified.

12. (Previously presented) A method as claimed in claim 1 wherein the hydrocarbon zone is characterized such that information about the type of oil, the quantity of oil, the quality of the oil, the sulphur content of the oil, the presence of gas or the gas:oil ratio is obtained.

13. (Previously presented) A method as claimed in claim 1 wherein the hydrocarbon zone is characterized such that the depth of a hydrocarbon zone is determined, wherein the particular microorganisms identified are indicative of a certain depth.

14. (Previously presented) A method as claimed in claim 1 wherein the hydrocarbon zone is characterized such that the migration route of said hydrocarbon zone is determined.

15. (Previously presented) A method as claimed in claim 13 wherein the hydrocarbon zone is an oil reservoir.

16. (Currently amended) A method as claimed in claim 1 wherein genotypic analysis is performed using one or more probes ~~selected from the group consisting~~ of SEQ ID No. 1 to SEQ ID No. 19, wherein at least one probe is SEQ ID No. 1.

17. (Withdrawn) The use of one or more oligonucleotide probes preferably a battery of probes in the generation of a microbiological profile of a sample as defined in claim 2, wherein said profile is for detecting, characterizing or monitoring a hydrocarbon zone.

18. (Withdrawn) The use of claim 17 wherein said microbiological profile is a pattern which can be compared with a reference sample.

19. (Withdrawn) A battery of probes for use in the method of claim 1.

20. (Withdrawn) An oligonucleotide as defined in any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof.

21. (Withdrawn) A solid support having attached thereto one or more oligonucleotides as defined in claim 20.

22. (Withdrawn) A solid support as claimed in claim 21 which is a microchip.

23. (Withdrawn) A solid support having attached thereto one or more oligonucleotides as

defined any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof, wherein the sold support has at least 4 oligonucleotides attached thereto.

24. (Withdrawn) A kit for use in a method as claimed in claim 1 comprising one or more oligonucleotides as defined in any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof.